REMARKS

In the Office Action dated February 3, 2003, the Examiner objected to the drawings. The Examiner rejected claims 2 and 15 under 35 U.S.C. § 112, first paragraph and rejected claims 1-15, 18, 19, 25, 27 and 28 under 35 U.S.C. § 103(a). The Examiner rejected claims 20, 21 and 23 without stating a basis for such rejections. The Examiner objected to claims 16, 17, 22, 26 and 28, but indicated that they contain allowable subject matter. The Examiner also objected to claim 24 under 37 C.F.R. 1.75. In an Amendment Under 37 C.F.R. § 1.116 filed March 24, 2003, the Applicants addressed these issues. The Examiner refused to enter the Amendment in an Advisory Action dated May 21, 2003. The undersigned wishes to thank Examiner Tamai for his courtesies during a telephonic interview with Applicants' attorney, Michelle L. Knight (Reg. No. 47711), on May 28, 2003. In that call, Examiner Tamai answered Ms. Knight's question of the previous day of Examiner Elkassabgi as to the proper date for a reply to the Advisory Action. Examiner Tamai indicated that the period for reply expires on the mailing date of the Advisory Action. The undersigned also wishes to thank Examiner Elkassabgi for her courtesies during a telephonic follow-up interview with Ms. Knight on May 29, 2003. In that call, the Examiner agreed to issue a Supplemental Advisory Action correcting the reply date and to include the status of claim 23, namely that the Examiner continues to reject claim 23.

The Applicants herewith submit another Amendment Under 37 C.F.R. § 1.116. After entry of this Amendment, claims 1-28 remain pending in the application. Claims 10, 16, 17, 22, 24 and 26 have been amended. No claims have been canceled or added. For the reasons set forth herein, the application is allowable over the prior art of record. Reconsideration is respectfully requested.

The undersigned also wishes to thank Examiner Elkassabgi for her courtesies during a first telephonic interview with Ms. Knight on February 21, 2003 ("the first interview"), and a second telephonic interview with Ms. Knight on February 25, 2003 ("the second interview"). In the first interview, the Examiner and Ms. Knight discussed the rejection of claims 2 and 15 under 35 U.S.C. § 112, first paragraph, and Ms. Knight suggested language that may address the rejection. No agreement was reached with respect to the claims. In the first interview, Ms. Knight also asked the Examiner to clarify the various objections to the drawing

figures. In the Office Action, the Examiner objects to the drawings as being of insufficient quality to permit examination. In the first interview, the Examiner clarified that the drawings are of sufficient quality to permit examination. In the Office Action, the Examiner also objected to the drawings as failing to comply with 37 C.F.R. 1.84(p)(4), stating that the reference numerals 32 and 18 have both been used to designate the ring magnet, but further stating that it is clear from the drawing that the ring magnet 32 and ring magnet 18 are different. The Office Action further states that a distinction needs to be made between the two magnet rings in the specification. In the first interview, the Examiner suggested describing ring magnets as a first and a second ring magnet.

It is respectfully submitted that the element numbering for the two ring magnets 18 and 32 conforms with the requirements of 37 C.F.R. 1.84(p)(4), and that the specification is completely clear that the ring magnet 18 is not the ring magnet 32. The ring magnet 32 is the ring magnet according to the aspect of Fig. 3, while the ring magnet 18 is the ring magnet according to the aspect of Fig. 1. While both are ring magnets, they are not identical in the two figures. Therefore, different numbers are provided in accordance with 37 C.F.R. 1.84(p)(4). As a courtesy, however, the Applicants have herewith submitted minor changes to the specification to describe the ring magnet 18 as a first embodiment of a ring magnet when initially describing the ring magnet 18. The Applicants have also made a minor change when initially referring to the ring magnet 32 to mention the other ring magnet 18. It is respectfully submitted that the drawing figure conforms to the requirements of 37 C.F.R. 1.84(p)(4).

In the second interview, Ms. Knight requested clarification as to whether claim 28 was rejected as described on pages 12 and 13 of the Office Action or whether claim 28 contained allowable subject matter as indicated on page 13 and in the Office Action Summary. The Examiner indicated stated that claim 28 is rejected as described on pages 12 and 13. Ms. Knight also requested clarification of the status of claims 20, 21 and 23, which were indicated as rejected in the Office Action Summary, but were not mentioned in the Office Action. The Examiner stated that claim 21 is rejected on the same basis as claims 6, 10 and 12 as described on pages 7 and 8 of the Office Action, that claim 20 is rejected on the same basis as claim 15 on pages 9 and 10 of the

Office Action and that claim 23 is rejected on the same basis as claims 18, 19, 25 and 27 on pages 10-12 of the Office Action. These rejections are addressed herein.

The Examiner rejects claims 2 and 15 under 35 U.S.C. § 112, first paragraph, but states that the "other of the rotor yoke" and "the other of the permanent magnet ring" is not clear and concise as to what the "other" is. It is respectfully submitted that claims 2 and 15 are clear and definite and meet the requirements of both sections of 35 U.S.C. § 112. As the Examiner is doubtless aware, the Patent Office had historically rejected claims using the word "or." During this period, however, the Patent Office accepted alternative language developed by practitioners. A widely used practice evolved whereby instead of stating "A or B," practitioners used the language "one of A and B." Thus, "the other of A and B" is B when the one of A and B is A. Similarly, the other of A and B is A when the one of A and B is B. Although the absolute prohibition of times past has changed, Applicants' attorney continues to adhere to this practice. In claim 2, when the rotor yoke is the annular member including depressed portions along a radially-outer peripheral edge, the other is the permanent magnet ring, which is ring-shaped. Similarly, when the permanent magnet ring is the annular member including depressed portions along a radially-outer peripheral edge, claim 2 states that the other is the rotor yoke. Claim 15 is similarly interpreted. The Applicants respectfully request that the Examiner withdraw her rejections to claims 2 and 15 on the basis of 35 U.S.C. § 112.

The Applicants gratefully acknowledge the indication of allowable subject matter in claims 16, 17, 22 and 26. Each of these claims has been rewritten to independent form to include all of the features of the base claim, either claim 1 or claim 15. It is respectfully submitted that these claims are in suitable condition for allowance.

The Examiner objects to claim 24 under 37 C.F.R. 1.75 as being a substantial duplicate of claim 22. Claim 24 has been amended to depend from 23. It is respectfully submitted that claim 24, which contains similar subject matter to claim 22, is also allowable over the prior art of record.

The Examiner rejects claims 1, 2, 4, 5, 7, 11, 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Kliman et al. (5,345,130) in view of Takahashi (5,682,072). The Applicants initially note that claims 4 and 5 depend from claim 3, so these claims will be discussed

with the rejection of claim 3. It is respectfully submitted that the cited references, either individually or in any permissible combination, fail to teach or suggest all the features of claim 1 and its dependent claims. First, even if Kliman et al. teaches that the rotor yoke (30) of Fig. 5 has depressed portions (32), it is respectfully submitted that the depressed portions are not shaped so the motor produces a sinusoidal flux density during operation. In fact, Kliman et al.'s "optimized field shaping" of the rotor of Fig. 5 results in "a substantially trapezoidal flux distribution that is substantially flat over approximately the central 120° of each respective 180° half-cycle thereof." (Kliman et al., Abstract; col. 2, ll. 61-65; col. 3, ll. 2-4; claim 1). Kliman et al. teaches that a rotor yoke 40 must be substantially square with rounded edges having permanent magnet material molded onto the square-shaped rotor core 40 as shown in Figs. 6a and 6b to produce a sinusoidal flux density. (Kliman et al., col. 4, ll. 3-9). In contrast, claim 1 teaches a permanent magnet ring having a radially-inner peripheral edge with a constant diameter and one of a rotor yoke and the permanent magnet ring being an annular member including depressed portions along a radially-outer peripheral edge. The depressed portions are shaped so the motor produces a sinusoidal flux density during operation. Kliman et al. neither teaches nor suggests all of the features of claim 1.

The addition of Takahashi (5,682,072) to Kliman et al. as suggested by the Examiner fails to cure this deficiency. First, the Applicants respectfully submit that there is no teaching or suggestion to combine these references. The Examiner states that Takahashi's teachings are directed toward adjusting the magnetic flux density in the gap between the output of the rotor, so it would be obvious to combine Kliman et al. with Takahashi for this purpose. It is submitted that the purpose of Takahashi is to minimize the variation in torque of the motor torque with the turn of the motor. (Takahashi, col. 3, ll. 17-19). Takahashi actually teaches away from any combination with Kliman et al. Specifically, Takahashi describes the prior art approach of minimizing the torque variation by shaping the flux density distribution curve into a trapezoidal wave curve, which Kliman et al. teaches in Fig. 5, as "impractical." (Takahashi, col. 3, ll. 8-13).

Further, even if Takahashi taught or suggested a permanent magnet ring having depressed portions along a radially-outer peripheral edge, the combination as cited by the Examiner still fails to teach or suggest all of the features of claim 1. Takahashi identifies the

problem with the prior art as being the sinusoidal wave variation in the flux density on the outer surface of the rotor 7, as described with reference to Figs. 3 and 4. (Takahashi, col. 2, line 34 to col. 3, line 13). To solve this problem, Takahashi proposes rotors with various configurations, such as rotor 107 of Fig. 7. Figure 9 shows the magnetic flux density curve of the rotor 107 shown in Fig. 7. (Takahashi, col. 5, ll. 53-55). It is clear from a cursory look at Fig. 9 and the other curves of Figs. 13, 17, 20, 25 and 34, that Takahashi teaches away from a rotor 107 with grooves 116 shaped so the motor produces a sinusoidal flux density during operation. For the foregoing reasons, claim 1 and its dependent claims 2, 6, 7, 11, 13 and 14 are allowable over the prior art of record.

It is respectfully submitted that claim 7 is also allowable over the prior art of record as none of the cited references teach or suggest the feature of claim 7 wherein the permanent magnet ring includes the depressed portions as explained with respect to claim 5 below, which contains a similar feature.

The Examiner rejects claims 3 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Kliman et al. in view of Takahashi and Nagate et al. (5,369,325). First, it is respectfully submitted that there is no teaching or suggestion in the prior art to combine these references. Nagate et al. does not teach a rotor yoke with a permanent magnet ring mounted on the rotor yoke having a radially-inner peripheral edge with a constant diameter and does not describe a resulting sinusoidal flux density. Nagate et al. embeds discrete permanent magnets into a rotor to prevent the magnets from flying off or otherwise incurring damage during rotation without covering the rotor with a protective member. (Nagate et al., col. 2, ll. 11-26). The Examiner selects Nagate et al. for its teaching of a skewed rotor yoke 7 comprising a stack of laminations 22. Picking and choosing only selected teachings of the prior art to deprecate the invention is not permissible without some motivation. Although efficient manufacture is certainly a goal of any manufacturer, there is no suggestion that the construction of Nagate et al. is any more efficient than the manufacture of either Kliman et al. or Takahashi. Indeed, due to the requirements for locating the permanent magnets of Nagate et al., the manufacture of Nagate et al.'s rotor 7 appears to be far more involved than the manufacturing process required with respect to either Takahashi or Kliman et al.

Further, even if the references were combinable, the combination would still fail to teach or suggest all of the features of claim 1, from which claims 3 and 8 depend. Specifically, the cited combination fails to teach a rotor yoke and permanent magnet ring as proposed by the Applicants where the depressed portions are shaped so the motor produces a sinusoidal flux density during operation. The failure of a purported combination of Kliman et al. and Takahashi to teach or suggest this feature is previously discussed. The addition of Nagate et al. to this combination does not cure this deficiency because, as mentioned, Nagate et al. does not teach or suggest this feature. For the foregoing reasons, the invention as defined by each of claim 3 and claim 8 is patentable over the prior art of record.

In addition to the foregoing, it is respectfully submitted that one of skill in the art would not be motivated to include a skewed rotor yoke as taught by the Applicants in claim 3 in either of Kliman et al. or Takahashi, or the combination as proposed by the Examiner. In fact, adding skew to a rotor yoke is taught away from by Kliman et al. and Takahashi as skew is conducive to the production of a sinusoidal flux density by a motor during operation, opposite to the goal of the cited embodiment of Kliman et al. to produce a trapezoidal flux density curve and to the goal of Takahashi of producing various non-sinusoidal waveforms as discussed previously. Thus, in addition to the reasons set forth above, the cited combination fails to teach or suggest all of the features of Applicants' claim 3.

It is respectfully noted that claims 4 and 5 depend from claim 3, not claim 1. Thus, claims 4 and 5 are allowable over the prior art for the reasons stated with respect to both claims 1 and 3. In addition to the foregoing, the Applicants respectfully submit that the Examiner has failed to provide a motivation for including the prior art permanent magnet ring 16 of Fig. 1b in the invention of Kliman et al. embodied in Fig. 5 to render claim 4 unpatentable. Even though these are shown in the same reference, the claim must considered as a whole. When considering the claim as a whole, it is clear that Kliman et al. teaches that embodiments according to Figs. 6a and 6b are required to produce a sinusoidal flux density curve, which embodiments do not fall within the scope of Applicants' claim 1. The combination proposed by the Examiner, even if taught or suggested by Kliman et al., would result in a trapezoidal flux density distribution curve. Thus, claim 4 is allowable over the prior art of record.

With respect to claim 5, neither Kliman nor Takahashi teaches or suggests a permanent magnet ring including the depressed portions. The Examiner suggests that Takahashi teaches this feature, but it is clear that the "ring" 107 of Takahashi is a rotor yoke, not a permanent magnet ring. Using the rotor yoke 107 of Takahashi in Kliman et al., which is respectfully submitted to be taught against by Takahashi as described with reference to claim 1, makes the molded permanent magnet material surrounding the rotor yoke 30 of Kliman et al. unneeded because the rotor yoke 107 itself is sectionally-magnetized. Finally, there is no teaching or suggestion in either of the cited references that the inclusion of Takahashi's rotor 107 in Kliman et al. would result a sinusoidal flux density curve. Thus, claim 5 is also allowable over the prior art of record.

The Examiner rejects claims 6, 10 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Kliman et al. in view of Takahashi and Suzuki et al. (6,081,058). Minor changes have been made to clarify claim 10. It is respectfully submitted that there is no motivation to combine Kliman et al. with Takahashi as previously discussed, and, in any case, the Examiner's cited combination of these two references fails to teach or suggest all the features of claim 1, from which these claims depend. The addition of Sukuki et al. fails to cure these deficiencies in the cited combination of Kliman et al. and Takahashi. The Examiner states that it would have been obvious to one of ordinary skill in the art to combine Kliman et al.'s permanent magnet rotor with the permanent magnet shapes of Suzuki et al. to achieve a sine wave shape through the magnetic flux density distribution of an air gap from the depressions. However, it is respectfully submitted that Suzuki et al. fails to teach or suggest that the magnet shapes result in a sinusoidal waveform. Figure 7 of Suzuki et al. shows the surface magnetic flux density distribution of the rotor magnet with the change in air gap angle, which clearly shows that while such shapes approach a sine wave shape, they do not obtain a sinusoidal form. (Suzuki et al., Fig. 7 and col. 2, ll. 20-21). Further, Kliman et al. teaches away from such a combination by its teachings that the embodiments of Fig. 6a and 6b are needed to produce a sinusoidal flux density curve. For the foregoing reasons, the invention as defined by claim 1 and its dependent claims 6, 7, 10 and 12 is neither taught nor suggested by any permissible combination of the cited references.

The Examiner rejects claims 9 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Kliman et al. in view of Takahashi and Peterson (3,909,647). The Examiner states Peterson teaches a permanent magnet motor having a ring-shaped permanent magnet 40 that is pressed and has a magnet ring of rare earth material to achieve a practical and efficient configuration. The Applicants respectfully submit that the Examiner's purported motivation for combining these references, adjusting the magnetic flux density in the gap, does not exist in the Peterson reference. In fact, Peterson does not discuss the magnetic flux density produced by the motor during operation at all. Further, and as discussed previously, the Examiner's cited combination of Kliman et al. and Takahashi fails to render claim 1, from which claims 9 and 13 depend, unpatentable. Peterson fails to cure this deficiency because Peterson fails to teach or suggest that it would result in the motor producing a sinusoidal flux density. Thus, claims 9 and 13 are similarly allowable over the prior art of record.

The Examiner rejects claim 15 and its dependent claim 20 under 35 U.S.C. § 103(a) as being unpatentable over Kliman in view of Takahashi. The Examiner cites Kliman et al. for each of the features of the claim except for the feature of a rotor yoke with a magnet ring that has depressed portions along the radially outer peripheral edge of the magnet ring. The Examiner cites Takahashi for this feature and states that it would have been obvious to combine these references to adjust the magnetic flux density in the gap. It is respectfully submitted that the feature of a magnet ring having depressed portions along its radially outer peripheral edge does not exist in the invention as claimed in claim 15. Instead, claim 15 describes one of the rotor yoke and the permanent magnet ring including a plurality of depressions along a peripheral edge adjacent the other of the permanent magnet ring and the rotor yoke where the plurality of depressions are shaped so the motor produces a sinusoidal flux density during operation. It is respectfully submitted that neither of the cited references taken singly or in any permissible combination teach or suggest these features of claim 15 and its dependent claims 18, 19, 20, 25, 27 and 28.

The Examiner rejects claims 18, 19, 23, 25 and 27 under 35 U.S.C. § 103(a) as being unpatentable over Kliman et al. in view of Takahashi and Nagate et al. As previously discussed with respect to claims 3 and 8, it is first submitted that there is no teaching or

suggestion in the prior art to combine these references. Nagate et al. concerns only the construction of a rotor with embedded discrete permanent magnets designed to prevent the magnets from flying off or otherwise incurring damage during rotation without covering the rotor with a protective member. (Nagate et al., col. 2, ll. 11-26). The Examiner selects Nagate et al. for its teaching of a skewed rotor yoke 7 comprising a stack of laminations 22 mounted on a shaft 8, and states that efficient manufacture would lead one of skill in the art to use these features in a purported combination of Kliman et al. and Takahashi. However, it is respectfully submitted that while the construction of Nagate et al. may be efficient for its complicated construct, it is unlikely that its construction is more efficient than that described in, for example, Kliman et al.

Further, even if the references were combinable, the combination would still fail to teach or suggest all of the features of claim 15, from which these claims depend. Specifically, the cited combination fails to teach one of the rotor yoke and the permanent magnet ring including a plurality of depressions along a peripheral edge adjacent the other of the permanent magnet ring and the rotor yoke as suggested by the Applicants where the plurality of depressions are shaped so the motor produces a sinusoidal flux density during operation. The failure of a purported combination of Kliman et al. and Takahashi to teach or suggest this feature is previously discussed. The addition of Nagate et al. to this combination does not cure this deficiency because, as mentioned, Nagate et al. does not teach or suggest this feature. For the foregoing reasons, claims 18, 19, 23, 25 and 27 are allowable over the prior art of record.

In addition to the foregoing, it is respectfully submitted that one of skill in the art would not be motivated to include a skewed rotor yoke as taught by the Applicants in claim 18 in either of Kliman et al. or Takahashi, or the combination as proposed by the Examiner. As discussed with respect to claim 3, adding skew to a rotor yoke is taught away from by Kliman et al. and Takahashi as skew is conducive to the production of a sinusoidal flux density by a motor during operation, opposite to the goal of the cited embodiment of Kliman et al. to produce a trapezoidal flux density curve and to the goal of Takahashi of producing various non-sinusoidal waveforms as discussed previously. Thus, in addition to the reasons set forth above, the cited combination fails to teach or suggest all of the features of Applicants' claim 18.

The Examiner rejects claims 21 and 28 under 35 U.S.C. § 103(a) as being unpatentable over Kliman et al. in view of Takahashi and Suzuki et al. First, the Examiner's cited combination of Kliman et al. with Takahashi, which is neither taught nor suggested by the prior art as previously discussed, fails to teach or suggest all of the features of claim 15, from which these claims depend. The addition of Sukuki et al. to the cited combination fails to cure these deficiencies. The Examiner states that it would have been obvious to one of ordinary skill in the art to combine Kliman et al.'s permanent magnet rotor with the permanent magnet shapes of Suzuki et al. to achieve a sine wave shape through the magnetic flux density distribution of an air gap from the depressions. However, Suzuki et al. neither teaches nor suggests the feature of claim 15 of the permanent magnet ring having a radial edge of a first constant radius opposed to the rotor yoke, or the feature of claim 15 that the rotor yoke includes a plurality of depressions along a peripheral edge adjacent the permanent magnet ring. In Suzuki et al., the grooves are on the rotor magnet 9 on the peripheral edge of the rotor magnet 9 facing the stator 4. Suzuki et al. teaches that this configuration is needed to approach, but not obtain, a sine wave shape in the surface magnetic flux density distribution of the rotor magnet with the change in air gap angle. (Suzuki et al., Fig. 7). Further, Kliman et al. that a rotor shaped as shown in Figs. 6a and 6b is needed to produce a sinusoidal flux density curve, suggesting that the shapes of Suzuki et al. would not be successful. For the foregoing reasons, claims 21 and 28 are allowable over the prior art of record, taken singly or in the combinations suggested by the Examiner.

It is respectfully submitted that the present amendment should be entered in the application under Rule 37 C.F.R. §1.116. The amendment to claim 10 does not raise new issues that would require further search or consideration and does not raise an issue of new matter because the features added were previously included in the claim. Therefore, these features were already considered and searched by the Examiner. The proposed amendment also places the application in better form for appeal by removing the objection to claim 24 and to the drawing figures. The proposed amendment also does not add new claims for consideration.

It is respectfully submitted that this Amendment traverses and overcomes all of the Examiner's objections and rejections to the application as originally filed. It is further submitted that this Amendment has antecedent basis in the application as originally filed, including the

specification, claims and drawings, and that this Amendment does not add any new subject matter to the application. Reconsideration of the application as amended is requested. It is respectfully submitted that this Amendment places the application in suitable condition for allowance; notice of which is requested.

If the Examiner feels that prosecution of the present application can be expedited by way of an Examiner's amendment, the Examiner is invited to contact the Applicants' attorney at the telephone number listed below.

Respectfully submitted,

YOUNG, BASILE, HANLON,
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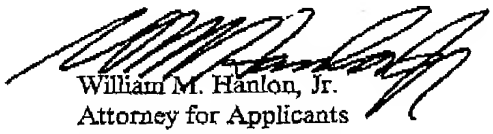

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